



## Complete Summary

---

### GUIDELINE TITLE

ACR Appropriateness Criteria™ for evaluation of the patient with painful hip or knee arthroplasty.

### BIBLIOGRAPHIC SOURCE(S)

Goergen TG, Dalinka MK, Alazraki N, Berquist TH, Daffner RH, DeSmet AA, el-Khoury GY, Keats TE, Manaster BJ, Newberg A, Pavlov H, Haralson RH, McCabe JB, Sartoris D. Evaluation of the patient with painful hip or knee arthroplasty. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl): 295-8. [23 references]

## COMPLETE SUMMARY CONTENT

SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

RECOMMENDATIONS

EVIDENCE SUPPORTING THE RECOMMENDATIONS

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

QUALIFYING STATEMENTS

IMPLEMENTATION OF THE GUIDELINE

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

CATEGORIES

IDENTIFYING INFORMATION AND AVAILABILITY

## SCOPE

### DISEASE/CONDITION(S)

Painful hip or knee arthroplasty

### GUIDELINE CATEGORY

Diagnosis

### CLINICAL SPECIALTY

Nuclear Medicine  
Orthopedic Surgery  
Radiology

### INTENDED USERS

Health Plans  
Hospitals  
Managed Care Organizations  
Physicians  
Utilization Management

#### GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for patients with a painful hip or knee arthroplasty.

#### TARGET POPULATION

Patients with painful hip or knee arthroplasty

#### INTERVENTIONS AND PRACTICES CONSIDERED

1. Radiographs with comparison to prior studies
2. Nuclear Medicine:
  - 3-phase bone scan
  - In-111 white blood cell scan
3. Invasive
  - Aspiration
  - Arthrogram and aspiration

#### MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

### METHODOLOGY

#### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

#### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

#### NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

#### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)  
Weighting According to a Rating Scheme (Scheme Not Given)

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

#### METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

#### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

#### METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

#### DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

#### RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

#### COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Painful Hip or Knee Prosthesis

Variant 1: Suspect loosening with or without infection (first imaging study).

Radiologic Exam Procedure	Appropriateness Rating	Comments
Radiographs with comparison to prior studies	9	
Nuclear Medicine		
3-phase bone scan	1	
In-111 white blood cell scan	1	
Invasive		
Aspiration	1	
Arthrogram plus aspiration	1	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1 =Least appropriate 9=Most appropriate		

Variant 2: Radiographs normal, suspect loosening without clinical suspicion of infection.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Invasive		
Aspiration only	1	
Arthrogram plus/minus aspiration	1	
Nuclear Medicine		
In-111 white blood cell scan	1	
3-phase bone scan	No Consensus	Although no consensus was reached, the panel generally favors 3-phase bone scan for hip prosthesis and arthrogram for knee prosthesis evaluation. These procedures should be reserved for selected patients on the basis of clinical suspicion and symptoms.
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1 =Least appropriate 9=Most appropriate</p>		

Clinical Condition: Painful Hip or Knee Prosthesis

Variant 3: Radiographs normal, clinical suspicion of loosening and/or infection.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Invasive		
Aspiration plus/minus arthrogram	8	
Aspiration only	1	
Nuclear Medicine		
3-phase bone scan	No Consensus	The majority of the panel believed nuclear medicine studies in this setting were not indicated.
In-111 white blood cell	No Consensus	The majority of the panel believed

scan		nuclear medicine studies in this setting were not indicated.
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1 =Least appropriate 9=Most appropriate</p>		

Variant 4: Radiographs abnormal, consistent with loosening. Suspect infection.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Invasive		
Aspiration plus/minus arthrogram	9	
Nuclear Medicine		
3-phase bone scan	1	The majority of the panel believed nuclear medicine studies in this setting not indicated.
In-111 white blood cell scan	No Consensus	
<p align="center"><u>Appropriateness Criteria Scale</u></p> <p align="center">1 2 3 4 5 6 7 8 9</p> <p align="center">1 =Least appropriate 9=Most appropriate</p>		

### Summary

When a patient with a hip or knee arthroplasty presents with unexpected joint pain, a clinical problem is the exclusion of prosthesis loosening, with or without infection. In addition to the clinical evaluation of the patient and determination of the sedimentation rate, there are several imaging or image-guided procedures that may be employed.

Imaging studies available for detection of loosening includes: (1) evaluation of serial plain radiographs, (2) contrast arthrography, (3) radionuclide arthrography, and (4) three-phase bone scan. For detection of infection, studies include (1) joint aspiration, and (2) In-111 leukocyte scan. The gallium scan for detection of infection seems to have fallen from usage since the introduction of the In-111 leukocyte scan.

The "gold standard" for proof of component loosening is surgery. The "gold standard" for proof of infection is intraoperative culture. Preoperative exclusion of infection is important in the planning of prosthesis revision; infected components must be removed and cannot generally be revised at the same setting.

To assess the efficacy of these studies in the preoperative evaluation of these patients, one must also consider the cost of the procedure(s) being performed (resource utilization). Relative to other musculoskeletal imaging procedures, the volume of patients being evaluated for this problem is low and the advantage of knowing preoperatively whether there is loosening, or infection, or both, is high. These factors must be included in any evaluation of appropriate utilization.

#### CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

### EVIDENCE SUPPORTING THE RECOMMENDATIONS

#### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

### BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

#### POTENTIAL BENEFITS

Appropriate selection of radiologic exam procedures to evaluate patients with painful hip or knee arthroplasty.

Subgroups Most Likely to Benefit:

Patients with prosthesis loosening

#### POTENTIAL HARMS

None identified

### QUALIFYING STATEMENTS

#### QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those

exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Goergen TG, Dalinka MK, Alazraki N, Berquist TH, Daffner RH, DeSmet AA, el-Khoury GY, Keats TE, Manaster BJ, Newberg A, Pavlov H, Haralson RH, McCabe JB, Sartoris D. Evaluation of the patient with painful hip or knee arthroplasty. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl):295-8. [23 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

1995 (revised 1999)

### GUIDELINE DEVELOPER(S)



American College of Radiology - Medical Specialty Society

#### SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria™.

#### GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Musculoskeletal Imaging.

#### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Names of Panel Members: Thomas G. Goergen, MD; Murray K. Dalinka, MD; Naomi Alazraki, MD; Thomas H. Berquist, MD; Richard H. Daffner, MD; Arthur A. DeSmet, MD; George Y. El-Khoury, MD; Theodore E. Keats, MD; B.J. Manaster, MD, PhD; Arthur Newberg, MD; Helene Pavlov, MD; Robert H. Haralson, III, MD; John B. McCabe, MD; David Sartoris, MD

#### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

#### GUIDELINE STATUS

This is the current release of the guideline. It is a revision of a previously issued version (Appropriateness criteria for evaluation of the patient with painful hip or knee arthroplasty. Reston [VA]: American College of Radiology (ACR); 1995. 4 p. [ACR Appropriateness Criteria™]).

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The next review date for this topic is 2004.

#### GUIDELINE AVAILABILITY

Electronic copies: Available from the [American College of Radiology \(ACR\) Web site](#).

Print copies: Available from ACR, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

#### AVAILABILITY OF COMPANION DOCUMENTS

None available

#### PATIENT RESOURCES

None available

## NGC STATUS

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001.

## COPYRIGHT STATEMENT

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions.

Appropriate instructions regarding downloading, use and reproduction of the American College of Radiology (ACR) Appropriateness Criteria™ guidelines may be found at the American College of Radiology's Web site, [www.acr.org](http://www.acr.org).

© 1998-2004 National Guideline Clearinghouse

Date Modified: 11/15/2004

**FIRSTGOV**

